Effect of ventricular fibrillation and potassium induced arrest on myocardial recovery in hypothermic hearts. *Surg Forum*. 1980;31:296-8.

Discussion

Dr Davis C. Drinkwater *(Nashville, Tenn).* I very much enjoyed the article. One point and question come to mind with this potential technique. Myocardial distention on a ventricle might be injurious, particularly in an immature heart under fibrillatory arrest. Therefore, if you have a left-sided valve problem, presumably you are going to try to open that valve. Are you concerned about creating an insufficient valve under those conditions as opposed to the crossclamp condition in terms of less precise pressure control and causing left ventricular distention with possible poor myocardial protection?

Dr Malhotra. You are always worried about distention when using fibrillation, but if you can restore the patterns of blood flow, you can avoid the potentially adverse effects of hypothermia. From a practical standpoint, fibrillation is easier to accomplish in the fetus than hypothermic cardioplegic arrest.

Dr John E. Mayer, Jr *(Boston, Mass).* I am sure this is not an easy model to work with, and it has got to be a real challenge to get these things to work. There are a few interesting questions that sort of came up in my own mind, one of which is with the fetal Po_2 values being quite a bit lower than they are in postnatal life, how do you think that the effect of using a Langendorf preparation, where you almost certainly have hyperoxic conditions, might yield results that would be at variance with what you might see in a fetal myocardium?

Dr Malhotra. That is excellent point. We actually did take that into account, and we were very sensitive to the effects of hyperoxia. We did, at periodic intervals, perform blood gas analysis of the perfusate and attempted to keep the Po_2 between 30 and 40 mm Hg.

Dr Mayer. Okay. And then the second issue, which is related: have you considered using a blood prime or a blood perfusate in your circuit rather than the crystalloid Langendorf type preparation?

Dr Malhotra. Actually, when we first thought about designing the model, we wanted to use a blood prime, but, as you know, the difficulty was in having enough fetal blood to use. Because of the differences in fetal and adult hemoglobin, we did not want to use pooled blood from adults.

Dr Frank W. Sellke *(Boston, Mass).* I agree, this is an outstanding study; it is extremely novel and innovative. You only gave one dose of cardioplegia crystalloid solution. Do you think that provided optimal protection?

How could you modify the cardioplegic solution to take into consideration the immature nature of the calcium-handling system within the immature myocardium to provide optimal protection?

Dr Malhotra. Repeat your first question, please.

Dr Sellke. You gave one dose of the crystalloid cardioplegia.

Dr Malhotra. Right. That is one of the things we want to look at in the future. Dosing of cardioplegia in neonates varies from institution to institution, but from discussions with the perfusionists and the staff at the University of California, we were comfortable with using one dose for a 30-minute arrest period. Of course, in the future, we can look at multiple dosing. In terms of modifying cardioplegia to account for the immaturity of fetal calcium regulation, we presented our studies at the American Heart meeting this past November, in which we altered the calcium concentration in the cardioplegic solutions, and found that there is a profound influence of calcium cardioplegic concentration.

Dr Erik A. Beyer *(Cleveland, Ohio).* I had a question about the Langendorf model. You seem to suspend the heart from the aorta and the pulmonary artery, is that correct?

Dr Malhotra. From the SVC and the aorta.

Dr Beyer. Does that have any effect on the hemodynamic measurements that you have? Did you try to rest the heart from its apex or posteriorly from the atrium to more simulate a more normal situation?

Dr Malhotra. We went through a number of iterations with this model, and initially we had started out with suspending or having it rest on a platform, but we graduated to this and did not find any difference in hemodynamic performance.